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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/358,940	07/22/1999	WHONCHEE LEE	3028.1US-(96	2152

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EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/358,940

Applicant(s)

LEE ET AL.

Examiner

Lan Vinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-9 and 11-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-9 and 11-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/12/2005 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 8 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 56-029332

JP 56-029332 discloses an etching method using a mixture of/consisting of HF/claimed fluorine-containing solution and acetic acid/claimed organic acid (see constitution). The volumetric ratio of acetic acid to HF is 10: 1 (col 4). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957)

The limitations of claims 2-3, 8 have been discussed above

4. Claims 9, 11, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Rothschild et al (US 4,938,850)

Rothschild discloses a method for plating using a solution includes/consisting of concentrated/glacial acetic acid/organic acid and 49% by weight of HF/fluorine-containing solution (col 3, lines 55-60). It is noted that no patentable weight is given to the phrase "which selectively etches BSPG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

It is also noted that the limitation of "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" recites the property of the claimed etchant solution. "Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since Rothschild teaches an etching solution having identical chemical structure as the claimed etchant solution, the "selectivity ratio of BPSG over TEOS between about 27:1 and 55:1"/claimed property of the etchant is necessarily present.

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5. Claims 9, 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 56-029332

JP 56-029332 discloses an etching method using a mixture of/consisting of HF/claimed fluorine-containing solution and acetic acid/claimed organic acid (see constitution). The volumetric ratio of acetic acid to HF is 10: 1 (col 4), which encompasses the claimed range of 1:1 to about 500:1 as required in claim 13.

It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

It is also noted that the limitation of "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" recites the property of the claimed etchant solution. "Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since JP 56-029332 teaches an etching solution having identical chemical structure as the claimed etchant solution, the "selectivity ratio of BPSG over TEOS between about 27:1 and 55:1"/claimed property of the etchant is necessarily present.

The limitations of claims 11-12, 14 have been discussed above

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6. Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by De Brebisson (US 4,443,933)

De Brebisson discloses a method of manufacturing a semiconductor device comprises the step of etching using a solution containing/consisting of ammonium fluoride/fluorine-containing solution and glacial acetic acid (col 5, lines 44-47). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

It is also noted that the limitation of "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" recites the property of the claimed etchant solution. "Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since De Brebisson teaches an etching solution having identical chemical structure as the claimed etchant solution, the "selectivity ratio of BPSG over TEOS between about 27:1 and 55:1"/claimed property of the etchant is necessarily present.

7. Claim 17 is rejected under 35 U.S.C. 102(b) as being anticipated by Dao et al (US 5,824,601)

Dao discloses an etching solution includes/consisting of oxalic acid/organic acid and HF/fluorine-containing solution (col 1, lines 55-57; col 2, lines 43-45). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

It is also noted that the limitation of "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" recites the property of the claimed etchant solution. "Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since Dao teaches an etching solution having identical chemical structure as the claimed etchant solution, the "selectivity ratio of BPSG over TEOS between about 27:1 and 55:1"/claimed property of the etchant is necessarily present.

8. Claims 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Stacher (US 5,039,612)

Stacher discloses a method for detecting surface oxidation using a solution includes/consisting of oxalic acid and HF/ fluorine-containing solution (col 2, lines 16-20) col 4). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably

significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957)

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dao et al (US 5,824, 601) in view of Morimoto (US 4,721,548)

Dao discloses an etching solution includes/consisting of glacial acetic acid/organic acid and 49 % by weight of HF/fluorine-containing solution (col 1, lines 55-57; col 2, lines 43-67). Dao also discloses that the mixing ratio of carboxylic acid to HF is not critical (col 2, lines 49-50). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957)

Unlike the instant claimed inventions as per claims 4, 6, Dao fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF (col 3, lines 15-17)

Thus, one skilled in the art would have found it obvious to vary the volume ratio of the acetic acid in Dao etching solution in view of Morimoto teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Brebisson (US 4,443,933) in view of Morimoto (US 4,721,548)

De Brebisson discloses a method of manufacturing a semiconductor device comprises the step of etching using a solution containing ammonium fluoride and glacial acetic acid (col 5, lines 44-47). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).. Unlike the instant claimed invention as per claim 7, De Brebisson fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF (col 3, lines 15-17)

Thus, one skilled in the art would have found it obvious to vary the volume ratio of the acetic acid in De Brebisson etching solution in view of Morimoto teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

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12. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dao et al (US 5,824, 601) in view of Morimoto (US 4,721,548)

Dao discloses an etching solution includes/consisting of oxalic acid/organic acid and HF/fluorine-containing solution (col 1, lines 55-57; col 2, lines 43-45). Dao also discloses that the mixing ratio of carboxylic acid to HF is not critical (col 2, lines 49-50). It is noted that no patentable weight is given to the phrase "which selectively etches BPSG over TEOS" because the intended use of composition is not patentably significant. *In re Alberton* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957)

Unlike the instant claimed inventions as per claim 16, Dao fails to disclose the specific volume ratios of the acetic acid with the HF.

Morimoto discloses a semiconductor planarization process comprises the step of varying the volume ratio of acetic acid with HF (col 3, lines 15-17)

Thus, one skilled in the art would have found have found it obvious to vary the volume ratio of the acetic acid in Dao etching solution in view of Morimoto teaching because Morimoto discloses that the acetic acid is used to dilute the solution and to prevent etching of the wafer back (col 3, lines 18-20)

Response to Arguments

13. Applicant's arguments filed 5/12/2005 have been fully considered but they are not persuasive.

Applicants argue that the limitation of "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" recites the selectivity ratio is affected by the claimed etchant solution and must be given patentable weight. However, the limitation of "wherein said etchant solution exhibits a selectivity ratio of BPSG over TEOS between about 27:1 and 55:1" also recites the property of the claimed etchant solution. It is noted that "Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since the cited prior art teach an etching solution having identical chemical structure as the claimed etchant solution, the "selectivity ratio of BPSG over TEOS between about 27:1 and 55:1"/claimed property of the etchant is necessarily present.

In response to applicant's argument that there is no suggestion to combine the Morimoto reference and the primary references in the 103 rejection(s) because the Morimoto solution includes additional component, Morimoto does not teach or suggest that the same ratio would be successful if the nitric acid were removed, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21

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USPQ2d 1941 (Fed. Cir. 1992). In this case, although the examiner recognizes that Morimoto solution includes additional element, the examiner only relies on Morimoto for the teaching that the specific concentration of acetic acid is used to dilute a solution and to prevent etching of the wafer back. Since the motivation to combine the references come from the Morimoto, one skilled in the art at the time the invention was made would have found it obvious to combine the teaching of Moromimoto and the other references to produce the claimed invention.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.



LV

June 22, 2005